

Tunable, Narrow Line Width Mid-Infrared Laser Source, Phase I

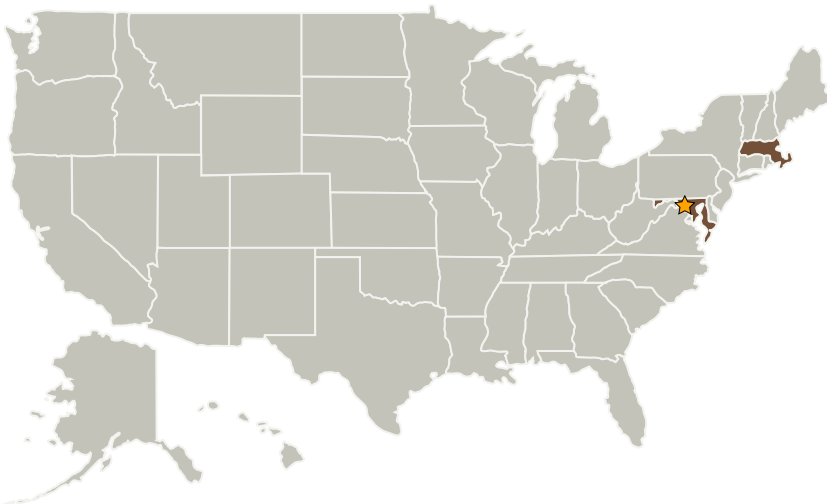
Completed Technology Project (2009 - 2010)



Project Introduction

Maxion Technologies, Inc. (Maxion) and Professor Mario Dagenais and his group at the University of Maryland (UMD) jointly propose to develop a compact, efficient, single mode, narrow linewidth tunable laser source in the 3.2-to-3.6 micron wavelength region. This effort, if successful, will assist NASA in its trace gas detection objectives by supplying NASA with the most critical (and difficult to obtain) laser source required. During the Phase 1 portion of this effort, Maxion and UMD propose to: a) develop/demonstrate a low-loss IC laser design, b) develop ultra-low modal reflectivity anti-reflection (AR) output facets on interband cascade laser (ICL) gain chips, and c) validate the AR coating quality by demonstrating continuous tuning of an ECL using the high temperature, state-of-the-art AR-coated gain chip developed during this program. The low-loss ICL design is important to improve the maximum cw operating temperature of IC lasers, currently limited to near-room-temperature values. The ultra-low reflectivity coating will permit the maximum possible wavelength tuning range to be achieved. This is important as it will realize tunability throughout the widest possible range (the goal being 3.2-to-3.6 microns) using a single semiconductor laser chip. The new low-loss IC design and the ultra-low reflectivity output facet represent, together, the two central roadblocks Maxion sees to achieving a compact, tunable laser source in the mid-infrared wavelength region. Consequently, the Phase I effort will represent a feasibility study to see if our approaches to overcoming these two roadblocks can be successful.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Maxion Technologies, Inc.	Supporting Organization	Industry	JESSUP, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Transitions

**January 2009:** Project Start**January 2010:** Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John D Bruno

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers